

THE GENUS MELINAEA HUBNER, WITH A  
DESCRIPTION OF A NEW SPECIES  
(LEPIDOPTERA, ITHOMIINAE)

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The genus *Melinaea* is in much the same case as *Mechanitis*, on which I have already reported (JOURN. N. Y. ENT. SOC. 32, 145, 1924). The material here discussed is from the same sources, save that less was taken on the Expedition, and series have been short. As in the case of *Mechanitis* there has never been any systematic study of the genus, although it is of special interest on account of its involvement in many cases of mimicry.

The genus belongs to another tribe of Ithomiinæ, more primitive in having preserved a well formed fore tibia and tarsus, although in two species these reach a marked state of reduction. The characters are: eyes naked, fore wing with middle discocellular vein angled, with a strong medial spur from its angulation, hind wing with lower discocellular straight, and practically continuous with the cubitus, the middle discocellular angled with a spur; Sc and R widely spaced, from their first separation. Fore tibia and tarsus of male distinctly separate, taken together from two fifths as long to somewhat longer than the femur, when shortest with the femur long and almost reaching the eye, as in *Mechanitis*. Male genitalia characteristic and remarkably uniform, the uncus simple and normal, but with two large chitinous lobes arising from the articulation of the valves, which I will call "dorsal lobes," possibly homologous with the angulate subscaphium of *Mechanitis* and some other genera. Juxta a wide-open V. Valves slightly asymmetrical, thick, with sinuous ventral and shorter dorsal margin, the apex of the right valve with two strong teeth, of which the upper is usually stronger, the left valve usually with the upper tooth weak, and occasionally even lost. Outer face of valve often continued beyond the teeth as

a thin plate enclosing a pocket between it and the teeth. (Absent in *M. egina*.)

There are no close relatives. *Hirsutis* and *Meehanitis* have closely similar patterns, partly no doubt due to mimicry, as parallel variations occur from place to place, but I suspect partly also by inheritance of the original *Ithomiinæ* pattern. The species with a short fore tibia may be distinguished from *Meehanitis* by the spur of *media* of the fore wing, which is attached to the lower discocellular in *Meehanitis*.

For the determination of species the genitalia are a disappointment. *M. egina* with its variety *paraiya* differs in lacking the apical pocket on the valve, and *comma* has a slightly different dorsal lobe and ædæagus; the remainder show some variation, but so little that it may be individual rather than specific, and I dare not use it with the short series available.

I recognize the following species, some of which may yet be combined:

1. *egina*, Cr., with var. *paraiya* Reak.
2. *lilis* D. & H., with vars. *imitata*, *dodona*, *parallelis* and *mesatis*, and ab. *flavicans* Hoffm.
3. *scylax* Salv.
4. *ethra* Gdt.
5. *mnemopsis* Berg.
6. *idæ* Fld.
7. *mneme* L., with var. *satevis* D. & H.
8. *mediatrix* Weym., with var. *mauensis* Weym. and ab. *anina* Hänsch.
9. *mælus* Hew., with vars. *manga cydon* G. & S., *madeira* Hänsch (Stgr. ms.) and perhaps *zamora* Hänsch, and *discurrens* Hänsch, which is insufficiently described.
10. *marsæus* Hew., with vars. *lucifer*, *divisa*, *phasiana*, *oresteo* and perhaps *zamora*.
11. *menophilus* Hew., with vars. *magnifica*, *zaneka*, *clara*, *messenina*, *mothone*, *cocana*, *hicetas*, *flavosignata* and perhaps *maculosa*, *discurrens* and *tarapotensis*.
12. *maenius* Hew., with var. *Chincha* Dr.
13. *comma* Fbs.

Of these the first six seem distinct enough, with the remote possibility that *scylax* is a form of *lilis*. *Mediatrix* might possibly be a form of *mneme*, though that is unlikely as they seem to fly together without mixing at Kartabo, B. G.; and it is also possible that *maëlus* with its form is a local representative of *mediatrix*, although the difference is of pattern and not development of markings merely. All the later species (save the last which has a good structural character) are also under suspicion. I have been unable to recognize *maëlonis* Hew.

SYNOPSIS OF THE FORMS HERE RECOGNIZED AS SPECIES

- A. Subapical band formed of a continuous patch in cells  $R_3-M_1$  or  $M_2$ , divided at most by fine black veins; base of cell  $Cu_1$  solidly yellow. Male fore tibia very short, genitalia without apical pocket on valve .....**egina**.
- AA. Subapical band more or less broken into spots, or confined to a single cell; base of cell  $Cu_1$  black, or containing a black spot; valve with well-marked apical pocket and plate.
- B. Hind wing with a separate submarginal spot in cell  $M_2$ , in line with the others; fore wing with comma-mark in cell  $Cu_1$  fully formed, as usual in *Mechanitis*, confined between the veins, and connected by a streak from its *upper edge* to the black on the outer margin, which contains a tawny spot beneath. Male fore tibia very short.....**comma**.
- BB. Hind wing with submarginal spot in cell  $M_2$ , when present, much farther from margin than those below it, frequently fused with postmedial spot; fore wing with comma-mark crossing  $Cu_1$ , or else with the black line connecting it with the margin attached to its center, frequently covered with black suffusion. No tawny marginal spot beneath. Fore tibia nearly as long as femur.
- C. Hind wing with separate postmedial and submarginal series of spots (or with postmedial spots in contact with cell, or if hind wing is immaculate, with its black border linear and the spot in base of cell  $Cu_1$  of fore wing small, or hind wing suffused with black); front margin of cell of hind wing with a large black patch along its outer part.
- D. A conspicuous series of double white marginal spots beneath, or with a conspicuous series of black mar-

\* Forms marked with an asterisk are in the collection of Cornell University or my own collection.

† Forms marked with a dagger have been examined in American collections.

- ginal triangles toward apex of hind wing; fore wing with a separate yellow (rarely tawny) anal spot.
- E. Inner margin of fore wing and base of hind wing almost out to fork of  $Cu$  black, hind wing with postmedial and submarginal series of spots recognizably distinct, at least beneath, and with a red submarginal streak in cell  $M_3$  more conspicuous than those below and usually above it.
- F. Comma-mark forming an oblique hook, its apex pointing toward anal angle; under side without, or with very few white marginal spots .....**maëlus**.
- FF. Comma-mark narrower not so formed; under side with many conspicuous white marginal spots .....**mediatrix**.
- EE. Inner margin of fore wing of the reddish ground-color, base of hind wing with practically no black. Hind wing without traceably separate subterminal and postmedial bands.....**mneme**.
- DD. Hind wing with border linear, at least toward apex, without white spots. Fore wing usually without yellow anal spot.
- E. Fore wing with a conspicuous yellow anal spot, comma-mark large and hooked and spot in base of  $Cu_1$  large, as in **maëlus** group, hind wing with postmedial line touching cell, but without trace of subterminal spots .....**zamora**.
- EE. No separate anal spot, comma-mark and spot in base of cell  $Cu_1$  small and widely separated, hind wing normally with black subterminal patches.
- F. Comma-mark in cell  $Cu_1$  large, crossing  $Cu_1$ , with a recurrent point aiming at the anal angle, though widely separated from the small base of the cell, unlike **zamora**.....**marsaeus**.
- FF. Comma-mark composed of a nearly round spot, part of which lies above  $Cu_1$ , connected at its middle to outer margin by a black streak .....**maenias**.
- FFF. Comma-mark entirely confined between  $Cu_1$  and  $Cu_2$  with a fine line connected to its middle .....**menophilus**.

- CC. Hind wing normally with a single postmedial band or row of spots, well separated from the cell; when absent with the border not linear below, and with no separate or partly separate black area over outer costal part of cell, but usually with a conspicuous oblique bar at base of cell. Spot in base of cell  $Cu_1$  of fore wing large, frequently with this cell almost solid black.
- D. Fore wing with a large black spot in the base of cell  $Cu_1$ , extending from  $1/3$  to  $3/5$  way to margin, and only separated by a narrow pale streak from the heavy black filling of the outer part of the cell; yellow anal spot usually absent.
- E. Spots or black filling in bases of cells  $M_2$  and  $M_3$  similarly lengthened, hind wing with border fairly broad and containing conspicuous white marginal spots, at least below, and with at least traces of a postmedial band .....**hills.**
- EE. A double black spot at end of cell only; hind wing wholly tawny, with only a narrow black border, frequently without white marginal spots above or below .....**scylax.**
- DD. Fore wing with only a small black spot in base of cell  $Cu_1$ , (when the cell is wholly suffused with black more or less visible below) yellow anal spot present.
- E. A single rounded subapical spot in cell  $R_5$ , comma-mark in the form of a broad club-shaped bar extending in upper part of cell  $Cu_1$  from margin two thirds way in to cell; antenna wholly black .....**ethra.**
- EE. A subapical band or series of spots, in cells  $M_1$  and  $M_2$  as well as  $R_5$ ; outer part of cell  $Cu_1$  solidly black, obliquely cut off at about half its length, or the cell all black; club of antenna yellow.
- F. Cells  $M_3$  and  $Cu_1$  almost solid black, enclosing a rounded spot over  $Cu_1$  widely separated from the postmedial fascia; hind wing with postmedial band rudimentary, and border moderate and even in width; antenna with club only yellow.....**mnemopsis.**
- FF. Cell  $Cu_1$  obliquely divided into a yellow base and black outer part,  $M_3$  also yellow at the base, the yellow spot in its outer part sometimes connected with the yellow base.

Hind wing with outer half solid black, and no postmedian fascia. Outer half of antenna yellow ..... **idae.**

**M. mnasias** Hew., **thera** Fld., **tecta** Haensch. The large single marginal spots of these species show plainly that they belong to the second group of the Ithomiinae (Mechanitis and following genera). I strongly suspect that they are Ceratinias.

**M. equicola** Cr. As already noted (Journ. N. Y. Ent. Soc. 32, 153) this is a Mechanitis obviously the same species as *sylvanoides* G. & S., and *equicoloides* G. & S.

**M. egina** Cr. This is a well-marked species, both on structure and pattern; the very short fore tibia and tarsus separate it from all except *M. comma*, from which the absence of a pit at the apex of the valve separates it sharply. It is the only species without black in the base of cell  $Cu_1$  of the fore wing. A peculiarly primitive character is that there is frequently a *white* marginal spot in cell  $Cu$ , the anal spot of all the other species being formed by the fusion of this spot with the normally yellow or tawny submarginal one.

#### KEY TO FORMS

- A. Hind wing with a large black discal patch.....\***e. egina.**  
 AA. Hind wing with a narrow border and separate series of discal spots .....\***e. paraiya.**

**M. lilis** D. & H. I have grouped perhaps too miscellaneous a series of forms under this name, but they appear to be geographical representatives of each other. The way in which *messatis* and *scylax* seem to lie between the more typical *lilis* and *imitata*, is curious, but may be due to a more advanced form taking possession of the center of distribution, and driving the earlier types to the margins. A similar case in North America is the Black Swallowtail, where the central *polyxenes* form is more advanced in pattern than the Central American *stabilis*, the Cuban *asterias*, and Newfoundland *brevicauda*, which closely resemble each other. I have let *scylax* stand as a separate species in the list and key, but very much doubt its distinctness.

I have seen a specimen from Trinidad (determined incorrectly as *tachypetis*) with the yellow postmedial band much widened,

joining broadly to the tawny area in cell  $Cu_1$  and in end of cell; the spot in the base of cell  $M_3$  being wholly lacking, and that in  $M_2$  very short.

KEY TO FORMS

- A. Apical half of fore wing black, with at least the submarginal spots white and visible on the upper side.
  - B. Spots in outer part of fore wing all white.
    - C. Hind wing with a longitudinal black median band.....\***l. parallelis.**
    - CC. Hind wing with only outer half of band visible.....†**l. messatis.**
  - BB. Marginal spots only white, the others yellow.....**l. dodona.**
- AA. Apical half of fore wing banded, without white submarginal spots above.
  - B. Fore wing with a continuous black stripe from base of costa out through cell and along upper side of  $Cu_1$  half way (or more) to margin.....**l. imitata.**
  - C. Hind wing with a yellow median stripe, as in *M. ethra*.....†**ab. flavicans.**
  - CC. Hind wing with ground all concolorous tawny.....\***typical.**
  - BB. Fore wing with the stripe interrupted at lower side of cell. Post-medial band in typical specimen joining the tawny base, more often separated from it.

**M. scylax** Salv. Certainly a derivative from the same stock as *M. lilis*, but differing in such definite ways that it seems best to hold it as a species. Godman and Salvin note that it seems to replace the *lilis* forms where it occurs. There is a little variation, mostly in the white submarginal dots, which may be wholly absent in the male, but are present in the female.

**M. ethra** Gdt. Another derivative from something like *lilis*, but separated by a wide area from which I have seen no representative of the group with a single band on the hind wing. It would not surprise me if intermediate forms were eventually discovered. The wholly black antenna is, I believe, unique in the genus.

**M. mnemopsis** Berg. A very distinct species, so far as pattern goes, but with the usual complete lack of structural characters. The relation of the spots in cell  $Cu_1$  (visible beneath), and the enlarged subapical spot, suggest a distant connection with *M. ethra*, distorted by mimicry of *Mechanitis ocona*.

**M. idae** Fld. In this species the banding of the hind wing fails entirely. I put it with the single-banded species which precede it because of the oblique division of cell  $Cu_1$  into black and yellow, as in *egina* and the rounded subterminal spot in cell  $M_3$ , similar to *egina*, *mnemopsis* and *messatis*; there is also no outer cell-spot on the hind wing below. On the other hand there is no trace of the special structures of *M. egina*.

**M. mneme** L. It is a temptation to unite *mneme* and *mediatrix*, but they fly side by side, apparently without mixing. Granting that they are distinct, *satevis* certainly goes with *mneme*, having an identical fore wing pattern. There is no trace of a postmedial band on the hind wing, save in one specimen in the U. S. National Museum, which shows a complete tawny band from the apical spot to the anal angle, half way between the cell and margin, with which the usual slender tawny streak in cell  $M_3$  is connected.

A similar specimen is also figured (under the equivalent name of *crameri*) in the Transactions of the Entomological Society of London for 1906, Pls. xxiv and xxv, fig. 5. The conspicuous outer cell-spot on the under side of the hind wing, and the general resemblance to *mediatrix* also indicate *mneme* belongs to the two-banded group.

## KEY TO FORMS

- A. Ground tawny, hind wing black with tawny base and apex, and rarely a tawny stripe.....\***m. mneme.**  
 AA. Ground deep wing red, hind wing with black border only.....\***m. satevis.**

**M. mediatrix** Weym. (*mneme* auct.) This is a typical member of the two-banded group, to which all the following species belong. The two bands (postmedial and subterminal) are at least partially separate beneath in all the specimens I have seen, but even if they should unite completely, the black inner border of the fore wing (shared by the following species) would separate it from *mneme*. Var. *mauensis* flies with the type and intergrades with it in British Guiana.

## KEY TO FORMS

- A. Hind wing almost solidly black.....\***m. mediatrix.**  
 AA. Hind wing with two distinct bands.



- B. Yellow transverse band of fore wing continuous, and not separated from the tawny base.....**m. mauensis.**
- BB. Yellow band divided into two isolated spots.....**ab. anina.**

**M. maelus** Hew. This series of upper Amazonian forms has the pattern as well as the color modified by entering into the usual heavily marked, mahogany colored mimicry group of the upper Amazon, with *Mechanitis egaënsis*, *Ceratinia tigrina* and *Sais zitella*. I have chosen the condition of the pattern in cell Cu<sub>1</sub> of the fore wing as the primary character to separate this and the three following species (or groups of forms) as on the whole least distorted by the various mimetic patterns, which make the color as well as the basal, apical and hind-wing patterns of relatively little significance. In this series not only is the apex generally brown with yellow spots (except in *zamora* and *maeonis*, which very likely may be distinct), but the basal spot in Cu<sub>1</sub> and comma mark are both very large, and together nearly fill that cell. The white marginal spots have almost disappeared, but a few survive in some specimens. *M. zamora* has the fore wing pattern of this type, with the normal coloring of bright tawny and yellow, and the narrow hind-wing border, of the following, while variants of the following are known with a widened border on the hind wing. On the whole it would not be surprising if the present, preceding, and next three series, were all one species.

I have been unable to place several of Haensch's names, as he gives no clue to such details of pattern as seem to me significant, *discurrens* perhaps belongs here, and I include it in the key, as well as *maeonis* Hew., which is supposed to resemble *zamora*. All the material of *zamora* I have seen is from Venezuela, but appears to represent the name fairly. It was determined as *maeonis*, which it does not fit.

KEY TO FORMS

- A. Apical part of fore wing solid black.....**m. discurrens.**
- AA. Apical part of fore wing yellow-spotted on black.
  - B. Hind wing with a linear border, and paler orange-yellow median stripe .....**\*m. zamora.**
  - BB. Hind wing with marginal triangles.....**m. maeonis.**
- AAA. Ground of apical part of wing shaded with brown.

- B. Ground tawny, only two small subapical yellow spots..... **m. manga**.  
 BB. Ground red-brown or mahogany, three larger yellow spots.  
     C. No yellow postmedially ..... \***m. cydon**.  
 CC. A narrow yellow postmedial band..... \***m. maëlus**.  
 CCC. Medial as well as postmedial area largely yellow, partly  
       divided into two bands..... \***m. madeira**.

**M. marsaeus** Hew. I have tried to separate this and the two following series by a small pattern difference, that I hope may be uninfluenced by mimicry, but there is no difference whatever in structure, and all should probably be united. There is parallel variation between the three to a certain extent, and further collecting may show that each mimetic type exists in each species. All have their center of distribution in central Peru, and show there forms resembling more or less closely *Mechanitis mazaesus*. *M. phasiana* is a little peculiar in its mahogany apex, and at first glance suggests the preceding group, but the effect is produced by the enlargement of the apical spots and not by a paling of the ground color. It combines the large apical spots of *divisa* and tawny color of typical *marsaeus*. I have taken it at Puerto Bermudez in eastern Peru, a little out of the normal range of the *Mechanitis egaënsis* coloring.

## KEY TO FORMS

- A. Apical marks tawny, without yellow.  
     B. Three normal subapical spots..... **m. marsaeus**.  
     BB. Broad mahogany shades between the veins..... \***m. phasiana**.  
 AA. Apex solid black; no yellow at all above..... \***m. orestes**.  
 AAA. Apex black with a yellow subapical band formed of three fused spots.  
     B. Hind wing with bands fused into a large black patch.....  
       ..... \***m. lucifer**.  
     BB. Two separate bands..... **m. divisa**.

**M. menophilus** Hew. This species is evidently highly variable, but I am not at all certain that all the forms credited to it really belong. Besides forms which may belong to *maenius* and to *marsaeus*, which after all are only superficially distinct and may be all one species, there is a possibility, and even a probability that part of the material in collections standing as *menophilus* is *M. comma*. Besides typical *comma*, described below, which passes for typical *menophilus*, the specimen figured in the Trans.

Ent. Soc. London, '08, Pl. 33, fig. 1 would appear from the pattern to belong to *M. comma*. Prof. Poulton writes me that there are additional specimens in the Hope Collection—as well as others corresponding to fig. 2 of the same plate, which appear to represent true *mothone*. Their structure has not been examined.

As to true *mothone*, the original figure seems to belong to *M. maenius*, but the type should be examined.

## KEY TO FORMS

- A. Apex of fore wing solid black, without a subapical band or spots.  
 B. Hind wing and basal third of fore wing also black, leaving the tip of the hind wing red.  
 C. Outer half of median area of fore wing yellow.....†*m. messenina*.  
 CC. Median area of fore wing wholly red and black.....†*m. var. (mothone?)*  
 BB. Hind wing red with slender black margin only.....\**m. zaneka*.  
 BBB. Hind wing red, with one or two more or less distinct rows of spots on the disc.  
 C. Spots on hind wing weak, distal boundary of median area of fore wing only slightly irregular.....*m. membrorsa*.  
 CC. Spots on hind wing strong; distal boundary of band on fore wing regularly toothed.  
 D. Hind wing with two separate rows of large spots.  
 E. Ground dark brown; border of hind wing widened into spots.....*m. discurrens, m. maculosa*.<sup>1</sup>  
 EE. Ground light tawny; border of hind wing linear.....\**m. menophilus*.  
 DD. Hind wing with the spots fused into a patch.....†*m. cocana*.  
 DDD. Ground dull; band on fore wing very narrow and yellow .....*m. tarapotensis*.<sup>2</sup>  
 AA. Apical portion of fore wing with yellow or tawny spots.  
 B. Outer part of median area and subapical spots of fore wing both yellow .....†*m. flavosignata*.  
 BB. Median area wholly tawny.  
 C. Subapical spots also tawny.....*m. magnifica*.  
 CC. Subapical spots yellow.....\**m. hicetas*.

<sup>1</sup> The original descriptions of these forms (compared with *zaneka*) are wholly inadequate. The widened border of the hind wing of *discurrens* seems to point to a form of *maelus*.

<sup>2</sup> Also inadequately described.



irregular roundish spot in cell  $Cu_1$ , slightly nearer margin than base of cell, *not quite reaching*  $Cu$ , and typically not reaching  $M_3$  either, *with its upper end connected* by a streak to a larger triangular marginal patch, which narrowly joins the apical black area, and reaches down to the middle of cell  $Cu_2$ . Inner margin with a blackish streak, tapering to a point two thirds way out to anal angle. Hind wing concolorous with base of fore wing, with the usual fawn-brown costa and costal hair; postmedial band of a series of spots, the first small and in cell  $M_1$ , half way between cell and margin, the next two about as far from cell as from each other, the second wedge-shaped, with apex toward the cell, third an oblique parallelogram, fourth more rounded and a little farther from cell, and last one wedge-shaped, with its tip resting on the inner margin half way out to tip of  $3d$  A (substantially as in *menophilus*, save that the second spot is truncate at its outer end). Subterminal series similar, leaving a tawny band of almost even width between them and the postmedial series; *first spot opposite second postmedial, in cell  $M_3$ , rounded or irregular, not large, half way between postmedial and margin* (in *menophilus*, etc., close to tip of postmedial or absent); second and third spots squarish, *with outer end rounded* (normally notched in the other species), the fourth spot a triangular area resting on margin and extending from vein  $Cu_2$  to tip of  $3d$  A. No marginal spots, but fringe blackish.

Under side similar, *fore wing with more or less traces of a diffuse tawny subterminal band*, parallel to outer margin; black triangle at tip of vein  $Cu_2$  and cell  $Cu_1$  *with a tawny center* (absent in the mothone-like form according to Prof. Poulton); hind wing with additional longitudinal black patches from base of inner margin to a third way out on costal side of cell, and with a larger one centering on R, from two thirds way out on cell *to well beyond its tip*, rarely with these two spots fused into a costal band. Last subterminal spot sometimes divided in two parts and not quite reaching margin.

Fore tibia and tarsus of male less than half as long as trochanter and femur (about as long in most species), the tarsus about half as long as tibia. Female with tibia alone as long as femur. Male genitalia with dorsal process gradually tapering to a blade-like end, without the distinct shoulder of the typical species; *ædæagus* stouter than in the other species.

Type and three paratypes male, from the Chanchamayo District, Peru, through Rosenberg, in collection of Cornell University; paratype female in U. S. National Museum, also from the Chanchamayo; both lots originally determined as *M. menophilus*. The species is also, as Mr. Rosenberg informs me, in the British Museum, from the Adams Collection.

## EXPLANATION OF PLATES

## PLATE II.

Male genitalia of *Melinaea egina*, with ædæagus figured separately:

Tips of valves of *M. comma*, showing also tips of dorsal processes. The dorsal processes are not visibly asymmetrical, but the one on the left is figured as if seen edgewise, the other in flat view.

Tips of valves and left dorsal process of *M. scylax*; typical of the remaining species of the genus.

## PLATE III.

Diagrammatic representations of cell  $Cu_1$  (cell 2) of fore wing of each species of *Melinaea*.

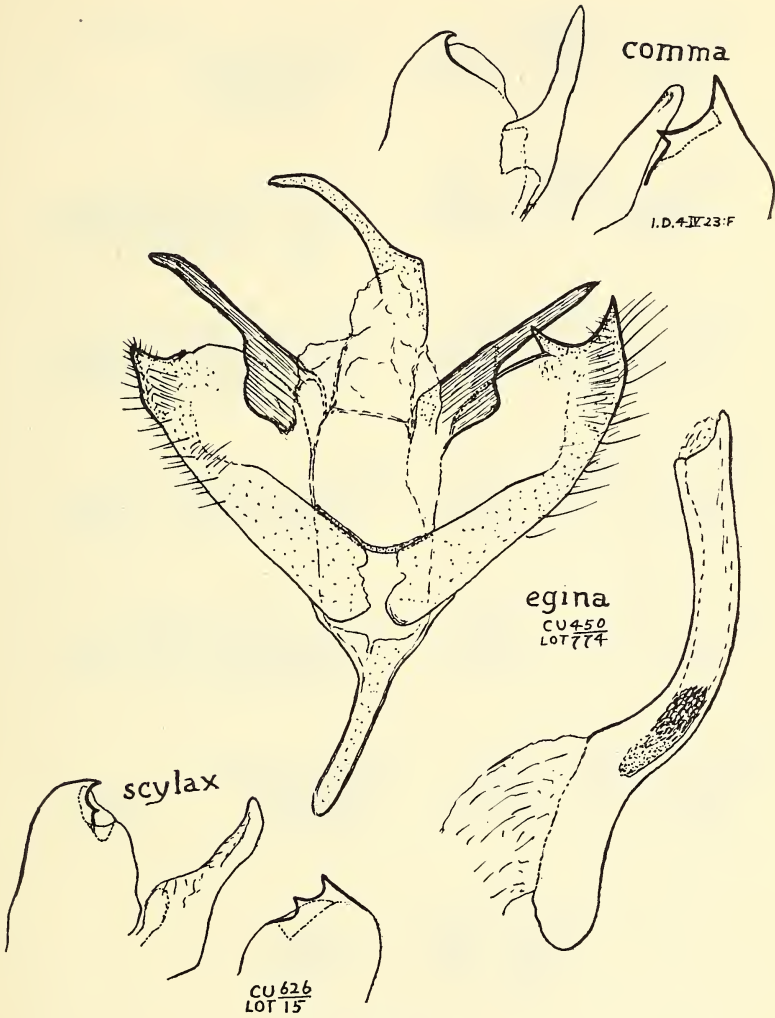
White areas represent white or yellow.

Dotted areas represent tawny or red-brown.

Striated areas represent deep brown.

Cross-hatched areas represent smoky.

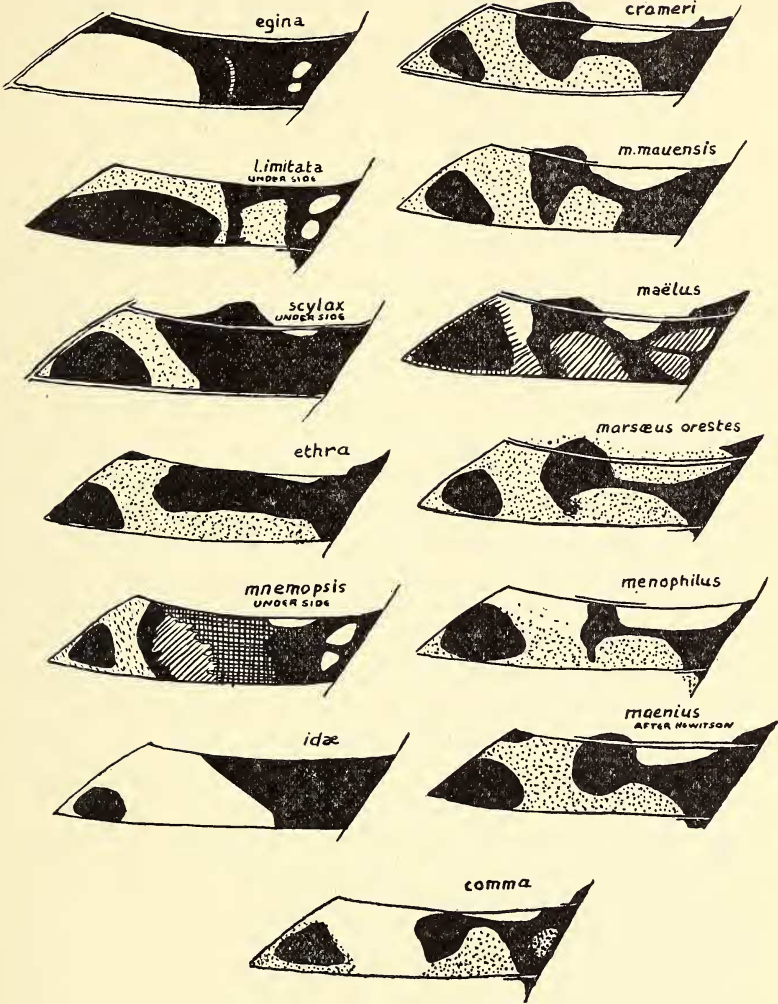
Black represents black.



MELINAEA







MELINAEA